REMARKS

Claims 1-3, 8, 18-20 and 25-36 are currently pending in this application. Claims 1, 8, and 28 have been amended to more particularly point out Applicant's invention. No new matter has been added to this application.

Objection to the Drawings

The Examiner has objected to the drawings for not showing each and every feature of the invention as specified in the claims. Specifically, the Examiner contends that the medical device recited in claims 1 and 18 is not shown in the drawings. Applicants' have amended claims 1 and 18 to remove the recitation of a "medical device" and replaced it with the term –virtual visualization tool--. Applicants submit that the new terminology is consistent with both the specification (see page 9, lines 8-16) and the drawings as originally filed. Applicants respectfully request that the objection to the drawings be withdrawn.

Claim Objections

The Examiner has objected to claims 1 and 18 due to informalities. Applicants have amended claims 1 and 18 as recommended by the Examiner and request that the objection to the claims be withdrawn.

Rejection of Claims 1-3, 8, 18-20, and 25-36 under 35 U.S.C. § 112

The Examiner has rejected claims 1-3, 8, 18-20, and 25-36 under 35 U.S.C. § 112, first paragraph, for failing to comply with the written description requirement. The Examiner contends that the claims contain subject matter that is not described in the specification. More specifically, the Examiner contends that the medical device is not described in the specification but rather a virtual endoscope with is not a physical object. Applicants have amended claims 1 and 18 to recite a –virtual visualization tool— instead of a "medical device" in order to

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make the claims consistent with the specification. Applicants respectfully request that the rejection of claims 1-3, 8, 18-20, and 25-36 under 35 U.S.C. § 112, first paragraph, be withdrawn.

Rejection of Claims 1-3, 8, 18-20, 25, 28, 29 and 31 under 35 U.S.C. § 103 (a)

The Examiner has rejected claims 1-3, 8, 18-20, 25, 28, 29 and 31 under 35 U.S.C. § 103 (a) as being unpatentable over U.S. Patent No. 6,346,940 (Fukunaga) in view of U.S. Patent No. 6,075,895 (Qiao). The Examiner contends that Fukunaga discloses a method for automatically remotely issuing commands to a medical imaging workstation. The Examiner correctly notes that Fukunaga does not teach or disclose using motion patterns or gestures to issue commands but rather uses conventional techniques such as a mouse which Applicants have acknowledged as a prior art method for issuing commands to a workstation. The Examiner contends that Qiao discloses a method for utilizing gestures to issue commands to a workstation that causes the workstation to automatically execute commands to perform functions corresponding to gestures. The Examiner argues that it would have been obvious to combine the methods of Fukunaga and Qiao to create utilize gestures to issue commands. Applicants respectfully traverse the rejection.

The present invention is directed to a method for automatically remotely issuing commands to a medical imaging workstation. A change in a background of an image from a plurality of images is determined. An object in the image is determined. A gesture is identified according to the trajectory motion pattern of the object. A determination is made as to whether the motion pattern corresponds to a valid command by classifying the motion pattern along windows in time. If the motion pattern corresponds to a valid command, the command is executed resulting in translational and rotational manipulation of a virtual visualization tool based on the command.

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Fukunaga discloses an image processing system that displays and endoscopic image of a three dimensional object from a desired viewpoint and direction. As indicated by the Examiner, Fukunaga uses conventional tools such as a mouse, keyboard or virtual operational device to issue commands the workstation. All of these tools require that the user physically manipulate the tool in order to control manipulation of the image. The present invention uses gestures to avoid the need for handling a tool and thereby running the risk of contaminating a sterile environment, such as is the case in medical procedures. The present invention allow a user to use predefined hand movements that produce recognizable motion patterns which result in the manipulation of a virtual visualization tool. Fukunaga does not teach or disclose the use of gestures for issuing commands to an image workstation. . .

Qiao discloses a method for recognizing a gesture of an image of a player. A portion of a background image is removed and replaced with the player's image which is mapped to a number of templates to generate a number of template outputs. The template outputs are analyzed to identify pre-defined gestures that correspond to gestures in the image. Qiao is directed to a player of a video game in which a player's movements are replicated by an image of the player that is portrayed on the game display. As such, if the player creates a gesture that emulates kicking or throwing a ball, that gesture is replicated by the player's image.

Applicants submit that Qiao's use of gestures is different than that of the present invention. Applicants' invention is directed to using a gesture to communicate commands to a medical imaging workstation that are to be executed by a medical device such as a virtual endoscope. Qiao uses template matching to identify a gesture. Template matching focuses on a preassembled set of rules or gestures. The rules are used to match a gesture to a particular template. If a match is discovered, the resulting gesture is performed.

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The present invention uses detection of motion patterns over time to identify a gesture. This is significant because when a motion pattern is detected, it is further monitored to determine the duration of the motion which corresponds to the intensity and scale of the resulting command (see claim 27). Applicants submit that Qiao does not teach or disclose identifying the motion pattern of an object as recited in independent claims 1 and 18. Furthermore Qiao does not teach or disclose a system or method that determines whether a gesture corresponds to a valid command and then instructing a device to execute the command resulting in rotation and translation of the virtual visualization tool as recited in amended claims 1 and 18. Applicants respectfully submit that Qiao does not teach or disclose Applicants' invention as claimed.

Applicants further submit that the combination of Fukunaga and Qiao does not teach or disclose Applicants' invention. Neither Fukunaga nor Qiao, whether taken alone or in combination, teach or disclose identifying a gesture according to the trajectory motion pattern of an object. Furthermore, Applicants' invention is directed to solving the problem raised in Fukunaga, namely the tying of a physician to a mouse or trackball for manipulating a virtual visualization tool. The present invention provides an improvement to this technique by allowing the physician to manipulate the virtual visualization tool without requiring a particular input device. This provides the benefit of not compromising the sterility of the physician's hands and provides an effective way for the physician to manipulate the tool in a precise and effective manner.

Applicants submit that the Examiner is using the hindsight of Applicant's invention to combine Fukunaga and Qiao to render obvious Applicants' invention. However, the combination of Fukunaga and Qiao, even if combinable does not teach Applicants' invention. Neither reference teaches a technique for recognizing gestures based on motion patterns over time. Claims 2, 3, 8, 19, 20, 25, 28, 29 and 31, being dependent upon claims 1 and 18 are also not

taught or disclosed by the references. Applicants request that the rejection of claims 1-3, 8, 18-20, 25, 28, 29 and 31 under 35 U.S.C. § 103(a) be withdrawn.

Rejection of claims 26 and 34 under 35 U.S.C. § 103 (a)

The Examiner has rejected claims 26 and 34 under 35 U.S.C. § 103 (a) as being unpatentable over Fukunaga in view of Qiao and further in view of U.S. Patent No. 6,332,038 (Funayama). Applicants respectfully traverse the rejection.

Claims 26 and 34 depend upon amended independent claims 1 and 18 which are directed to a method for automatically remotely issuing commands to a medical imaging workstation. Claims 1 and 18 further recite determining if a motion pattern corresponds to a valid command by classifying the motion pattern along windows in time. As discussed above, neither Fukunaga nor Qiao teach or disclose these limitations.

Funayama disclosed an image processing device that obtains an electronic image and is able to extract a partial image from the original image. Like Fukunaga and Qiao, Funayama does not teach or disclose a method for automatically remotely issuing commands to a medical imaging workstation. Nor does Funayama teach or disclose determining if a motion pattern corresponds to a valid command by classifying the motion pattern along windows in time. Applicants respectfully submit that neither Fukunaga nor Qiao nor Funayama, whether taken alone or in combination, teach or disclose Applicant's invention as recited in independent claims 1 and 18. Claims 26 and 34 being dependent upon independent claims 1 and 18 respectively, are also not taught or disclosed by the combination of references. Applicants request that the rejection of claims 26 and 34 under 35 U.S.C. § 103 (a) be withdrawn.

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Rejection of claims 27 and 33 under 35 U.S.C. § 103 (a)

The Examiner has rejected claims 27 and 33 under 35 U.S.C. § 103 (a) as being unpatentable over Fukunaga in view of Qiao and further in view of U.S. Patent No. 5,875,257 (Marrin). Applicants respectfully traverse the rejection.

Claims 27 and 33 depend upon amended independent claim 1 which is directed to a method for automatically remotely issuing commands to a medical imaging workstation. Claim 1 further recites determining if a motion pattern corresponds to a valid command by classifying the motion pattern along windows in time. As discussed above, neither Fukunaga nor Qiao teach or disclose these limitations.

Marrin discloses an apparatus for continuous sensing of hand and arm gestures. The sensed parameters are transduced into electrical signals indicative of the parameter quantities. The signals are used to control the performance of a musical composition. Like Fukunaga and Qiao, Marrin does not teach or disclose a method for automatically remotely issuing commands to a medical imaging workstation. Nor does Marrin teach or disclose determining if a motion pattern corresponds to a valid command by classifying the motion pattern along windows in time. Applicants respectfully submit that neither Fukunaga nor Qiao nor Marrin, whether taken alone or in combination, teach or disclose Applicants' invention as recited in independent claim 1. Claims 27 and 33, being dependent upon independent claim 1, are also not taught or disclosed by the combination of references. Applicants request that the rejection of claims 27 and 33 under 35 U.S.C. § 103 (a) be withdrawn.

Rejection of claims 30 and 32 under 35 U.S.C. § 103 (a)

The Examiner has rejected claims 30 and 32 under 35 U.S.C. § 103 (a) as being unpatentable over Fukunaga in view of Qiao and further in view of U.S. Patent No. 6,501,515 (Iwamura). Applicants respectfully traverse the rejection.

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Claims 30 and 32 depend upon amended independent claim 1 which is directed to a method for automatically remotely issuing commands to a medical imaging workstation. Claim 1 further recites determining if a motion pattern corresponds to a valid command by classifying the motion pattern along windows in time. As discussed above, neither Fukunaga nor Qiao teaches or discloses these limitations.

Iwamura discloses an electronic appliance remote controller which includes a display screen for displaying icons representing possible operations of the electronic appliance. Like Fukunaga and Qiao, Iwamura does not teach or disclose a method for automatically remotely issuing commands to a medical imaging workstation. Nor does Iwamura teach or disclose determining if a motion pattern corresponds to a valid command by classifying the motion pattern along windows in time. Applicants respectfully submit that neither Fukunaga nor Qiao nor Iwamura, whether taken alone or in combination, teach or disclose Applicant's invention as recited in independent claim 1. Claims 30 and 32, being dependent upon independent claim 1, are also not taught or disclosed by the combination of references. Applicants request that the rejection of claims 30 and 32 under 35 U.S.C. § 103 (a) be withdrawn.

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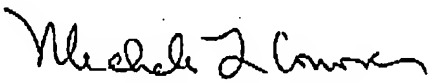
Conclusion

Applicant respectfully submits that claims 1-3, 8-13, 16-20 and 25-36, as amended, are in condition for allowance and request that a timely Notice of Allowance be issued in this case. The Examiner is invited to contact the undersigned should he have any questions in this matter.

Respectfully submitted,



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